

# **Bull Trout Habitat Limiting Factors**

**For Water Resource  
Inventory Area (WRIA) 62  
(Pend Oreille County,  
Northeast Washington State)**

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# ACKNOWLEDGMENTS

In accordance with RCW 77.85.070 (Salmon Recovery Act, previously Engrossed Senate House Bill 2496), a Technical Advisory Committee (TAG) was organized in February 2002 by the Washington Conservation Commission (WCC) in consultation with Pend Oreille (PO) County and the Kalispel Tribe (KNRD), by inviting private, federal, state, tribal and local government personnel with appropriate expertise to participate.

The role of the TAG was to identify the limiting factors for bull trout in WRIA 62 (RCW 77.85.070[3]), a portion of the Pend Oreille Subbasin falling within Washington State. The information was then incorporated into this report to support the Pend Oreille Lead Entity (POLE) Committee in their effort to compile a habitat restoration/protection projects list, establish priorities for individual projects, and define the sequence for project implementation (RCW 77.85.050[1c]).

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I am greatly appreciative to all the individuals who put whatever effort they could afford into the development of this report. It has been one more task on top of many demands on staff time. However, it is work that was certainly needed and I hope it will serve those of you who continue to work on bull trout recovery and watershed planning efforts in WRIA 62.

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# EXECUTIVE SUMMARY

## General Information

This report addresses WRIA 62, which is located in the northeastern corner of Washington State and encompasses that portion of the Pend Oreille subbasin that lies within Washington State. WRIA 62 is bordered by Canada to the north, Idaho to the east, and the Chewelah Mountains to the west. It encompasses the Pend Oreille River and its tributaries between the Canada border at RM 16.0 and the Idaho border at RM 87.8. WRIA 62 also includes a small portion of the South Fork Salmo River from RM 8.8 – 13.0, where it dips down into Washington State. The S. Fk. Salmo River is a tributary to the Salmo River which flows into the Pend Oreille River in Canada at RM 13.3. Some headwater portions of tributaries which drain to the Priest River system in Idaho are also captured in WRIA 62. The headwaters of tributaries contained within WRIA 62 that drain into Idaho waters include; Gold Creek, Jackson Creek, Bench Creek, Granite Creek, Kalispell Creek, Lamb Creek, Binarch Creek, Upper West Branch, and Lower West Branch.

The Columbia River Distinct Population Segment of bull trout, which includes the Pend Oreille subbasin populations, was listed under the ESA as "Threatened" on June 10, 1998 (63 FR 31647). The status of the Pend Oreille bull trout stock is identified by WDFW as "Unknown" (WDFW 1998, pg. 415). A rating of "Unknown" is applied when the stock has not been monitored or enumerated over a sufficient period of years to enable a quantitative analysis of its status. Determination of their status for future inventories will require more intensive stock assessment work (WDFW 1998, pg. 25).

Bull trout were once abundant in the Pend Oreille River having been documented as occurring historically in the Pend Oreille River downstream of Albeni Falls and upstream of Z Canyon (RM 19.0; Gilbert and Evermann 1895). Identified by name historically as "char", bull trout have not been conclusively documented as occurring historically in any tributary drainages to the Pend Oreille River other than LeClerc Creek. There is also no evidence to refute bull trout presence within tributaries to the Pend Oreille River system where natural blockages would not have prevented entry into tributary drainages (Lyons 2002). Given the knowledge of salmonid biology and behavior, the historic presence of bull trout in the mainstem Pend Oreille River (Gilbert and Evermann 1895), and a lack of natural barriers at tributary mouths, it is likely bull trout would have entered tributaries within the Pend Oreille River system whenever possible. Once in a river system, the strategy of salmonid species to enter accessible streams whenever possible is seen repeatedly, as with brook trout for example.

Currently, due to factors such as loss of habitat connectivity, habitat degradation, and non-native fish introductions, bull trout observations within WRIA 62 are now rare. Only 33 individual observations of bull trout (including both adults and juvenile sightings) have been documented in WRIA 62 since 1974. These 33 sightings do not include bull trout observations in the South Fork Salmo River, which is a tributary to the Pend Oreille River reach in Canada, and do not include sightings in the Kalispell Creek, Granite Creek, and Hughes Fork drainages which flow into the Priest River system in Idaho. Viable bull trout populations still exist in these drainages. Average densities of bull trout for the entire west side Priest Lake drainage in all habitat types sampled from 1982-1984 were 3.4 fish/100m<sup>2</sup> (Irving 1987, Figure 8). Since 1974, the only

documentation of reproducing bull trout in the lower Pend Oreille River tributary drainages located in Washington State has occurred in the LeClerc Creek drainage. In West Branch LeClerc Creek and East Branch LeClerc Creek, a total of 5 juveniles and 2 adults (one a female digging a redd) have been observed since 1993 (T. Andersen, KNRD, pers. comm., 2002; Plum Creek 1993 field notes).

There is some uncertainty in the historical literature as to which, if any, of the falls in the Pend Oreille River were absolute barriers to bull trout migration. Even currently, there are no specific criteria for bull trout passability at natural obstacles based on swimming speeds, jumping abilities and barrier navigation. Gilbert and Evermann (1895) and others (Abercrombie 1896; Rathbun 1895) visited the Pend Oreille River from Albani Falls (RM 90.1) downstream to at least Big Eddy Canyon (Z Canyon; RM 19.0) in the late 1800s. During early August, Gilbert and Evermann (1895) concluded that Albeni Falls, near the outlet of Lake Pend Oreille in Idaho, was not likely to provide a passage barrier to upstream migrating fish, although they did not refer to trout specifically. Rathbun (1895) however, did report trout passing freely up Albeni Falls at the time he observed the falls. Based on observations of Metaline Falls (RM 27.0) in mid-August of 1895, Gilbert and Evermann indicated that even Metaline Falls and Z Canyon could be passable to salmon, though salmon have never been documented to occur upstream of this point. Rathbun, on the other hand, took the position that salmon passage at Metalline falls could not be determined satisfactorily although one of his party felt salmon passage at the falls was not possible under the conditions observed during their visit. It should be noted that characterizations of the Pend Oreille River could vary considerably depending on the time of year observations were made.

Allan H. Smith, however, held a different opinion from Gilbert and Evermann concerning salmon passage in the Pend Oreille River prior to hydropower development. Smith was a well-respected scientist known for his work and personal knowledge regarding northwest Native American cultures and their fisheries in the early and mid-1900's. In a 1993 letter to fellow scientist James W. Mullan, A.H. Smith says,

“In truth, they [salmon] could not swim upriver beyond the formidable tumbling waters of Z Canyon [historically called “Big Eddy Canyon”] and Metaline Falls near the Canadian boundary. My own Kalispel Indian field data of the 1930's and lots of other evidence testify clearly to this fact” (Smith 1993, a letter to James W. Mullan, USFWS).

Bennett and Falter (1985) also concluded that Z Canyon (RM 19.0) and Metaline Falls at RM 27.0 (Bennett and Falter 1992) probably restricted anadromous chinook salmon and steelhead trout to the lower 27 miles of the Pend Oreille River.

Bull trout, however, exhibiting their various life history forms (fluvial, adfluvial, resident), would most likely have entered the Washington State portion of the Pend Oreille River system from reaches upstream of Albeni Falls dam, including the Lake Pend Oreille and Priest River areas. Regarding passage at Albeni Falls, Gilbert and Evermann (1895, pg. 181) described it this way:

“The falls were scarcely more than pretty steep rapids and would not interfere at all with the ascent of salmon.” The part to the left of the islands (going downstream), on August 9, 1892, had a total descent of “...probably 10 feet, but as a rapid, not in a vertical fall. During low water the descent would be somewhat greater. The fall on the right side [of the island] is of the same character and presents no greater difficulties. Just below Albeni Falls, the river is perhaps 1,000 feet wide and 20 to 30 feet deep in the channel.”

Although the Gilbert and Evermann report (1895) did not refer specifically to bull trout passage at Albeni Falls, they did comment that bull trout were “abundant in the Pend Oreille River.” They also recorded seeing in the possession of an Indian “several fine specimens, the largest of which was 26 inches long, 11 inches in greatest circumference, and weighed 5 pounds and 1 ounce.” Gilbert and Evermann also commented: “the people along the river know this fish [the bull trout] as the ‘char’ ”. A newspaper article in the April 3, 1957 issue of the Metlaine Falls Gazette reported that many large Dolly Varden [bull trout] were caught in the Pend Oreille during a 1957 Field and Stream tournament (Ashe and Scholz 1992, pg. 4). These reports help to document the extent of the historical existence of a bull trout fishery in the Pend Oreille River. Knowledge of bull trout biology and habitat use strongly suggests a historic connection to Lake Pend Oreille and to other tributaries in WRIA 62.

This Bull Trout Habitat Limiting Factors Report focuses on habitat conditions in WRIA 62 as they affect the ability of the habitat to sustain naturally-producing bull trout populations. It provides a snapshot in time based on the data and published material available during the development of this report and the professional knowledge of the WRIA 62 Pend Oreille Technical Advisory Group (TAG). Revisions to the report are not currently funded; however, it is the hope of the Washington State Conservation Commission (WCC) that the information and assessment provided here will be utilized and expanded in future subbasin planning efforts designed to promote the restoration of self-sustaining bull trout populations within the WRIA 62 portion of the Pend Oreille subbasin.

## **Factors Affecting Natural Salmonid Production in WRIA 62.**

It is apparent that the habitat of the mainstem Pend Oreille River is no longer suitable for the production of trout [in general] for which it once was known (Ashe and Scholz 1992, pg. 198). It is unknown which bull trout life history stage is currently most limiting to bull trout production in the lower Pend Oreille River system downstream of Albeni Falls and within Washington State. It is also unknown which habitat attribute or combination of habitat attributes negatively impacted by human activities, are most limiting each bull trout life history stage in the Lower Pend Oreille system downstream of Albeni Falls within Washington State. However, several factors are known to be significant in the decline of bull trout populations in the lower Pend Oreille River system within Washington State: habitat degradation on the mainstem and within the tributaries; human-made fish passage barriers into tributaries to the Pend Oreille River; exotic fish species introduction and management; and the construction and operation of three hydroelectric facilities on the mainstem Pend Oreille River (Boundary dam, Box Canyon dam and Albeni Falls dam). In addition, two more dams were built across the mainstem Pend Oreille River in Canada (Waneta dam and Seven Mile dam). The Northeast Washington Recovery Unit

Team feels that complete recovery of bull trout populations in the Pend Oreille River in Washington is contingent upon reconnection with the Lower Clark Fork Recovery Subunit in Idaho (that habitat upstream of Albeni Falls dam; USFWS 2002, pg. 1 of 26).

Over one hundred years ago, in the late 1880's, European descendents started activities that have impacted salmonids, including bull trout in the Pend Oreille subbasin. Sawmills were built in 1888 and logging began in earnest over the next 20 years as 250 sawmills were built in Pend Oreille County alone from 1900 to 1940. By 1927, the old growth in the county was gone. In place of old growth stands of white and yellow pine, less desirable douglas fir forests now grow. In addition, over 30 significant fires swept over Pend Oreille County from 1907-1939. Railroad levees and flood control dikes were built in Pend Oreille County during 1905 to 1913. Brown trout were introduced in the 1890's with additional fish planting of rainbow trout, brook trout, brown trout and bass (smallmouth and largemouth) occurring from the 1930's through the 1960's. The population in Pend Oreille County has reflected the "boom and bust" economy of the late 1800s and the 1900s in northeast Washington/northern Idaho. In 1905 - 1935 there were 30,000 people. Today the population is 10,000 to 11,000 people with towns that once held 5,000 people now being nothing more than a name on a map. In the 1950's, conversion of the mainstem Pend Oreille River into a series of five reservoirs associated with hydroelectric development began with the construction of Albeni Falls Dam in 1955. All the Pend Oreille River dams were built without fish passage facilities.

Today, for all practical purposes viable bull trout populations appear to have been extirpated from the Pend Oreille River and its tributaries between Albeni Falls and Boundary dams with only 33 bull trout observations in the past 28 years. Even given fish passage at Albeni Falls dam, it is not clear from the existing literature whether bull trout populations could be recovered in the Pend Oreille River system downstream of Albeni Falls dam. The USFWS Bull Trout Draft Recovery Plan for Northeast Washington (USFWS 2002, pg. 38) has stated that to reach a recovered condition within the Pend Oreille Core Area within 25 years could require the use of artificial supplementation. Studies to determine the effectiveness and feasibility of using artificial propagation to recover bull trout populations in the Northeast Washington Recovery Unit area are being recommended in the draft USFWS Bull Trout Recovery Plan, Chapter 23 (USFWS 2002, pg. 38). Following restoration of fish passage at Albeni Falls dam, the extent to which exotic fish species, Pend Oreille River habitat as impacted by dam operations, or man-made fish passage barriers and habitat degradation in tributary habitat would immediately preclude bull trout recovery is unknown.

On the Pend Oreille River system in Washington, Box Canyon Dam in Washington and Albeni Falls dam in Idaho have disconnected Lake Pend Oreille and the Priest River system in Idaho from the Pend Oreille River system downstream of Albeni Falls dam. Waneta and Seven Mile dams in Canada, and Boundary Dam just south of the Canada/U.S. border, without fish passage facilities, fragment the bull trout habitat in the very lower Pend Oreille River system downstream of Metalline Falls and Z Canyon. Other dams and water diversion facilities without fish passage facilities were constructed in tributaries to the Pend Oreille River and have further fragmented native populations and reduced connectivity (e.g. Sullivan Creek Dam, Mill Pond Dam, Cedar Creek Dam, Calispell Pumps, the Calispell Duck Club Dam, and the Priest Lake Outlet Dam).

Predation and competition from non-native salmonids and introduced warm-water fish species like largemouth bass, smallmouth bass, northern pike, walleye, and yellow perch, is also a significant limiting factor for bull trout in the mainstem Pend Oreille River and its tributaries within Washington State downstream of Albeni Falls. The extent to which exotic fish species predation and competition may limit bull trout recovery in this portion of WRIA 62, even given fish passage at hydroelectric dams on the Pend Oreille River, is unknown. However, without restoration of fish passage at Albeni Falls dam, no amount of habitat recovery efforts or the elimination of competition from non-native fish species could restore naturally sustainable bull trout populations in the Pend Oreille River system in Washington State downstream of Albeni Falls dam.

Also, the relative effect on bull trout production from the conversion of the Pend Oreille River to a reservoir system has not been adequately evaluated. In a study of fish and habitat conditions in the Boundary Reservoir, McLellan (2002, pg. 119) concluded that there is not a full understanding of all the limiting factors in the Boundary Reservoir system and how they relate to each other. The report concluded that what is known is that the major limiting factors in the Boundary Reservoir reach of the Pend Oreille River were related to water temperature, retention times, and daily water level fluctuations.

Man-caused habitat degradation associated with forest management practices, fire, hydroelectric development, flood control, livestock grazing, road construction, and land use practices associated with agriculture and residential/urban development has also impacted bull trout. Nearly all of the original forests between the major roads east and west of the Pend Oreille River are believed to have been logged or burned at least once since the mid-1800s (POPUD 2000, pg. E1-3). Human-caused habitat degradation presents problems in nearly all drainages; natural and human-made blockages limit available access to suitable habitat in others (Ashe and Scholz 1992, pg. 198-209).

The Priest River drainage bull trout populations are declining as well, even though connectivity to large lakes - where adfluvial bull trout migrate to mature for four to six years before returning to natal streams to spawn - is generally intact and there appears to be available habitat within the drainage for all life stages. There is an impassable barrier, Outlet Dam, at the outlet of the lower-most lake (Priest Lake). This decline in bull trout numbers in the Priest River system has been attributed to healthy lake trout populations in the lake environments that out-compete bull trout for habitat and prey on juvenile bull trout which migrate to the lake environments to mature (J. Dupont, IDFG, pers. comm., August 2002). In the tributary environments of the Priest River drainage, brook trout numbers are contributing to bull trout declines through competition for habitat and hybridization.

Within the Priest River system, bull trout observations are limited in the lower two-thirds of the drainage which includes Priest Lake and its tributaries, including Granite Creek which originates in Washington (Panhandle Basin Bull Trout TAT, 1998, pg. 9) and the East River which drains into the Priest River from the east at RM 23.0. In the East River drainage, which flows into the lower Priest River about 22 miles south of Priest Lake, the Idaho Department of Fish and Game (IDFG) is currently conducting a bull trout telemetry study with a limited number of tagged bull trout from the East River drainage. As of the time of writing of this report, the East River tagged

bull trout have been traced downstream to Lake Pend Oreille. The strongest remaining bull trout populations in the Priest River system are found in the upper portion of the Priest River drainage, in Upper Priest Lake and its tributaries like Hughes Fork, although in declining numbers (Panhandle Basin Bull Trout TAT, 1998, pg. 9; IDFG redd surveys 1992 – 2001; Irving 1987). The headwaters of tributaries to Hughes Fork lie within Washington in WRIA 62: Gold, Jackson and Bench creeks. The IDFG experimented in the summer of 2002 with using strobe lights in the Thorofare (the connecting body of water between Priest Lake and Upper Priest Lake) to deter the movement of lake trout from the lower to the upper lake. The IDFG hope to be able to continue the use of strobe lights in 2003.

The survey efforts and assessment of habitat productivity within the Lower Pend Oreille and Priest River Northwest Power Planning Council (NPPC) Planning Areas of the Pend Oreille Subbasin is fragmented and not coordinated (Table 1). After determining which bull trout life history stage habitat type (i.e. adult holding, juvenile rearing, incubation, juvenile overwintering) is most limited in the lower Pend Oreille planning area, bull trout productivity needs to be evaluated at a broader geographic scale than at just the reservoir reach or watershed level. An assessment of bull trout limiting factors at a broader geographic scale in the lower Pend Oreille River system is needed to facilitate more effective information gathering and exchange to develop a scientifically defensible restoration strategy. At a minimum scale, the assessment must take into account the relative importance of Lake Pend Oreille and the Priest River portions of the Pend Oreille Subbasin to bull trout recovery in the lower Pend Oreille River system.



Table 1: Project Comparisons in WRIA 62

Stream Name	Tributary To:	Known Bull Trout Distribution (WCC mapping)	Individual Observation only (WCC mapping)	Kalispel Resident Fish Project (KNRD)	Resident Fish Stock Status Project (WDFW)	Contains USFWS proposed Critical Habitat (2002b)
<i>Waneta Reservoir, Canada (RM 0.2) - Teck Cominco</i>						
<i>Seven Mile Reservoir, Canada (RM 9.0) - B.C. Hydro</i>						
Salmo River (RM 13.3)	Pend Oreille River	<b>X</b>				
S. Fk. Salmo River (RM 7.4)	Salmo River	<b>X</b>				
<i>Boundary Dam (RM 17.0) - Seattle City Lights / 1967</i>						
Pend Oreille River	Columbia River	<b>X</b>			<b>X</b>	<b>X</b>
Lime Creek (RM 18.0)	Pend Oreille River				<b>X</b>	
Pewee Creek (RM 19.0)	Pend Oreille River				<b>X</b>	
Slate Creek (RM 22.2)	Pend Oreille River				<b>X</b>	<b>X</b>
Flume Creek (RM 25.8)	Pend Oreille River				<b>X</b>	
Sullivan Creek (RM 26.9)	Pend Oreille River		<b>X</b> (below Mill Pond only)		<b>X</b>	<b>X</b>
Sweet Creek (RM 30.9)	Pend Oreille River		<b>X</b> (below the falls only)		<b>X</b>	
Sand Creek (RM 31.6)	Pend Oreille River				<b>X</b>	

Box Canyon Dam (RM 34.5) - Pend Oreille PUD / 1956						
Pend Oreille River	Columbia River	<b>X</b>		<b>X</b>		<b>X</b>
Cedar Creek (RM 37.7)	Pend Oreille River		<b>X</b> (just upstream of the dam)	<b>X</b>		<b>X</b>
Ruby Creek (RM 52.0)	Pend Oreille River					<b>X</b>
LeClerc Creek (RM 56.2)	Pend Oreille River			<b>X</b>		<b>X</b>
W. Br. LeClerc Creek (RM 1.0)	LeClerc Creek	<b>X</b>				<b>X</b>
Mineral Creek (RM 10.4)	W. Br. LeClerc Creek			<b>X</b>		
Whiteman Creek (RM 8.85)	W. Br. LeClerc Creek			<b>X</b>		
E. Br. LeClerc Creek (RM 1.0)	LeClerc Creek	<b>X</b>				<b>X</b>
Fourth of July Creek (RM 2.8)	E. Br. LeClerc Creek	<b>X</b> (up to RM 0.25 steep gradient)		<b>X</b>		<b>X</b>
Mill Creek (RM 58.3)	Pend Oreille River		<b>X</b> (lower 0.5 mile)	<b>X</b>		<b>X</b>
Cee Cee Ah Creek (RM 66.29)	Pend Oreille River			<b>X</b>		
Tacoma Creek (RM 66.3)	Pend Oreille River					<b>X</b>
Calispell Creek (RM 69.6)	Pend Oreille River					<b>X</b>
Smalle Creek (RM 2.5)	Calispell Creek					<b>X</b>
E. Fk.Smalle Creek	Smalle Creek					<b>X</b>
Indian Creek (RM 81.2)	Pend Oreille River		<b>X</b> (at the mouth)	<b>X</b>		<b>X</b>

<i>Albeni Falls Dam (RM 90.1) - U.S. Army Corps of Engineers / 1955</i>						
Priest River (RM 96.6)	Pend Oreille River	<b>X</b> (below East R. Confl. only)				
Lower W. Br. Priest River (RM 5.0)	Priest River					
East River (RM 23.0)	Priest River	<b>X</b>				
Upper W. Br. Priest River (RM 35.3)	Priest River					
Binarch Creek (RM 42.0)	Priest River					
Priest Lake (RM 45.0)	Priest River	<b>X</b>				<b>X</b>
Lamb Creek (RM 0.1)	Priest Lake					
Kalispell Creek (RM 4.5)	Priest Lake	<b>X</b>				<b>X</b>
Granite Creek (RM 10.0)	Priest Lake	<b>X</b>				<b>X</b>
S. Fk. Granite Crk. (RM 10.7)	Granite Creek	<b>X</b>				<b>X</b>
N. Fk. Granite Crk. (RM 10.7)	Granite Creek	<b>X</b>				<b>X</b>

<i>Albeni Falls Dam (RM 90.1) - U.S. Army Corps of Engineers / 1955</i>						
Tillicum Creek	N. Fk. Granite Creek	<b>X</b> (up to Highrock Crk. confl. only)				
Thorofare (RM 64.5)	Priest Lake	<b>X</b>				<b>X</b>
Upper Priest Lake (RM 67.2)	Thorofare	<b>X</b>				<b>X</b>
Upper Priest River (RM 70.2)	Upper Priest Lake	<b>X</b>				<b>X</b>
Hughes Fork (RM 0.5)	Upper Priest River	<b>X</b>				<b>X</b>
Gold Creek (RM 5.25)	Hughes Fork	<b>X</b>				<b>X</b>
Muskegon Crk.	Gold Creek	<b>X</b>				
Jackson Creek (RM 9.25)	Hughes Fork	<b>X</b>				
Bench Creek (RM 10.5)	Hughes Fork	<b>X</b>				

## **Summary of Habitat Conditions by WAU**

The following is a summary of habitat conditions by WAU that have been identified by the TAG during development of the report. A more detailed discussion of habitat conditions for each watershed can be found in the chapter titled: “Salmonid Habitat Conditions by WAU”. Past and existing efforts to maintain and restore bull trout habitat as well as other watershed management needs, are identified in the Draft Pend Oreille Subbasin Summary (KNRD 2001) compiled for the Northwest Power Planning Council (NPPC), and in the USFWS draft Bull Trout Recovery Plans for the Northeast Washington and the Clark Fork River Recovery Units (USFWS 2002; USFWS 2002a).

### **Mainstem Pend Oreille River.**

The portion of the mainstem Pend Oreille River included in the habitat limiting factors assessment extends from Boundary Dam (RM 17.0), located in Washington State one mile south of the Canada/United States border, upstream to Albeni Falls Dam (RM 90.1) in Idaho (2.3 miles east of the Idaho/Washington border). Five hydroelectric facilities have been constructed on the Pend Oreille River from its confluence with the Columbia River in Canada to Albeni Falls. None of these dams has fish passage facilities. Reestablishing the historic connection with Lake Pend Oreille (RM 115) in Idaho is essential for recovery of the Pend Oreille core area population in Washington (USFWS 2002). Dams on the Pend Oreille River downstream of Lake Pend Oreille have negatively impacted the connectivity for fluvial and adfluvial bull trout migratory life forms in areas where natural blockages did not occur, by isolating bull trout subpopulations, eliminating individuals from subpopulations, and reducing or eliminating genetic exchange (KNRD 2001, pg. 84; R2 Resource Consultants 1998, pg. 5-2). In addition to providing bull trout passage at Albeni Falls, the ability of the mainstem Pend Oreille River to sustain bull trout populations in the WRIA 62 also lies in reducing competition from non-native fish species to some as yet unknown level; providing fish passage at human-made barriers both on the Pend Oreille River and its tributaries; and restoring habitat conditions degraded by human activities to naturally support the maintenance of healthy bull trout populations.

### **South Salmo WAU (15,956 acres).**

The South Salmo WAU encompasses only that portion of the Salmo River drainage located in Washington State. This includes the South Salmo River from RM 8.8, where it flows south into the United States, upstream to RM 13.5 where it continues into Idaho. The South Salmo River is a tributary to the Salmo River and has its confluence in Canada. The Salmo River is a tributary to the Pend Oreille River joining it in the Seven Mile Reservoir in Canada. The entire South Salmo WAU lies within the Salmo Priest Wilderness Area (USFS 1999bb, pg. 1).

The factor most limiting bull trout populations in the Salmo River drainage and its tributaries had been legal harvest of bull trout up until 1999 (J. Baxter, Baxter Environmental, 2002, pers. comm.). Presently, hydroelectric development on the Pend Oreille and Columbia rivers may also be negatively affecting bull trout populations in the Salmo River watershed by eliminating spawning, rearing, and overwintering habitat while eliminating genetic exchange among bull trout populations using the Salmo River drainage. Even prior to the construction of Boundary

Dam, fish from the Salmo River system would not have been able to migrate upstream beyond Metalline Falls on the Pend Oreille River. Access to Pend Oreille River tributaries in Washington State downstream of Metalline falls is naturally limited to the Slate Creek drainage to the extent that passage is possible upstream of the natural cascades at RM 0.75 on Slate Creek. Fish from the Pend Oreille River upstream of Metalline Falls potentially could have migrated downstream to contribute to the fish stocks in the Salmo drainage, but there would have been no means for them to return to the Pend Oreille River and Lake Pend Oreille. Degraded habitat conditions have not been identified as a concern in the Salmo River watershed. The habitat quality of the S. Fk. Salmo River within Washington State is such that reaches of the river can be used as reference reaches for comparative purposes to assess the condition of managed reaches of similar land and channel type. The land classification for the South Salmo WAU is wilderness status throughout those portions of the South Fork Salmo River within Washington State (USFS 1999bb, pg. 1).

#### **Slate Creek WAU (46,803 acres).**

The Slate Creek WAU captures the Pewee, Lime, Slate, and Threemile creek drainages which enter the Boundary Reservoir reach of the Pend Oreille River. Both Pewee and Threemile creeks are naturally disconnected from the Pend Oreille River by falls at the mouths, and instream temperatures in Lime Creek naturally exceed the tolerance level for bull trout fry and juveniles. On Slate Creek, the extent to which natural cascades/falls/chutes beginning at RM 0.75 impede fish passage further into the drainage is uncertain. The extent to which bull trout could have successfully utilized Slate Creek habitat historically is not clear based on existing information. Bull trout have not been documented as occurring currently in the Slate Creek WAU. In the Slate Creek WAU only the Slate Creek drainage has been identified by the TAG as containing “Suitable” bull trout habitat.

Human-caused factors that are limiting the sustainability of bull trout populations in Slate Creek can be tied to occurrences outside the Slate Creek drainage. Habitat in the Slate Creek drainage is largely unimpacted by human activities. Instream conditions of managed stream reaches in Slate Creek are near the upper range of natural variability when it comes to pool frequency and large woody debris (LWD). Historic instream habitat conditions are represented by the lower reaches of Slate Creek

Out-of-drainage human alterations to the Pend Oreille River system that are limiting bull trout populations in the Slate Creek drainage include the modification of the Pend Oreille River from riverine to reservoir habitat. Assuming bull trout passage at Z Canyon, the construction of Boundary and Seven Mile and Waneta dams has isolated populations of fish and eliminated the fluvial and adfluvial life history form of bull trout in the lower Pend Oreille River system. The introduction of non-native fish into the reservoir and tributaries has also negatively affected the viability of bull trout in the Boundary Reservoir reach of the Pend Oreille River system by introducing increased competition with and possibly predation upon bull trout.

#### **Sullivan Creek Watershed (91,445.2 acres).**

Together, the Sullivan Creek WAU (58,685 acres) and Harvey Creek WAU (32,760 acres) make up the Sullivan Creek watershed and encompass all tributaries draining into Sullivan Creek.

Sullivan Creek ultimately drains into the Boundary Reservoir portion of the Pend Oreille River. Habitat capable of supporting strong and significant populations of native salmonids exists throughout the Sullivan Creek watershed, however there is disagreement over the extent to which the natural cascades and chute at RM 0.6 and 0.65 on Sullivan Creek currently block fish passage into the Sullivan Creek watershed. Bull trout have not been documented as occurring upstream of the uppermost natural cascades/chute at RM 0.65. The extent to which bull trout could have successfully utilized Slate Creek habitat historically is unknown.

Given natural fish passage at the lower cascades and chute, currently the Mill Pond dam and the Sullivan Lake dam block fish passage between the majority of habitat in the Sullivan Creek watershed and the mainstem Pend Oreille River system. Fish passage into North Fork Sullivan Creek is blocked by a natural falls just downstream of the N. Fk. Sullivan Creek dam (RM 0.25). The N. Fk. Sullivan Creek dam does not have fish passage. Fish passage up into Sullivan Creek is blocked at RM 3.25 by Mill Pond dam. Fish passage into Sullivan Lake and the Harvey Creek WAU is blocked 0.5 miles upstream from the confluence with Sullivan Creek. Outlet Creek flows into Sullivan Creek at RM 5.3.

Existing operations of Sullivan Lake dam and the Mill Pond dam have altered the channel equilibrium of lower Sullivan Creek. The Sullivan Creek habitat below Mill Pond Dam lacks LWD and gravels due to interception of upstream sources at the dam. Water temperatures also tend to be above the tolerance level for bull trout fry and juveniles during some summer months in this habitat below Mill Pond dam (USFS 1999ce, pg. 10). Sediment is not considered to be a serious problem in the watershed (USFS 1999ce, pg. 8, 9). Non-native salmonid species also occur in the watershed. The extent to which brown trout and brook trout may limit the recovery of bull trout populations in the Sullivan Creek watershed is unknown.

### **Box Canyon WAU (56,172 acres).**

The Box Canyon WAU captures the Flume, Sweet, Sand, and Cedar creek drainages. Flume, Sweet, and Sand creeks all drain into the Boundary Reservoir reach of the Pend Oreille River, located between Boundary Dam (RM 17.0) and Box Canyon Dam (RM 34.4); Cedar Creek drains into the Box Canyon Reservoir, located between Box Canyon Dam (RM 34.4) and Albeni Falls Dam (RM 90.1). Drainages within the Box Canyon WAU have been surveyed for habitat conditions to varying degrees using varying methodologies. This makes it difficult to evaluate the resulting data using any one set of habitat rating criteria.

Flume, Sweet, and Sand creeks offer limited access to habitat for migratory life history forms of bull trout due to natural barriers in close proximity to the mouths of the drainages (river miles 0.0, 0.6, and 1.25, respectively). Cedar Creek, draining into the Pend Oreille River upstream of Box Canyon Dam, has no natural barriers precluding access by migratory bull trout into the drainage. However the Cedar Creek municipal dam at RM 1.5 is currently a full barrier to fish passage, although in 1995, an 18-19 inch adult bull trout was observed just upstream from the Cedar Creek dam by KNRD/WDFW snorkelers (KNRD and WDFW 1997b, pg. 43). Based on habitat and fish survey efforts on Mill, Cee Cee Ah, LeClerc, Indian, and Cedar creeks (all emptying into the Box Canyon Reservoir), KNRD and WDFW (1997b, pg. 45) concluded that Cedar Creek may represent the best habitat conditions of all the streams in the Box Canyon reach of the Pend Oreille River. KNRD and WDFW (1997b, pg. 45) observed that Cedar Creek

exhibited the least degraded habitat of the streams assessed, especially in the upper reaches, and that the amount of consecutive stream reaches exhibiting quality habitat was unequaled. The extent to which bull trout could have successfully utilized habitat historically within the tributary drainages contained in the Box Canyon WAU is unknown. Individual observations of bull trout have been documented currently in the Box Canyon WAU; two observations in Sweet Creek and one observation in Cedar Creek. Limited “Suitable” bull trout habitat has been identified by the TAG in both Flume and Sand creeks. “Recoverable” bull trout habitat has been identified by the TAG in the Cedar Creek drainage.

#### **Muddy Creek WAU (39,151 acres).**

The Muddy Creek WAU captures the Little Muddy, Big Muddy, Maitlen and Renshaw creek drainages which enter the Box Canyon Reservoir of the Pend Oreille River. The existing habitat has been modified somewhat by human activities and bull trout are not known to currently occur in the WAU. It is unclear from the literature which human-caused actions are contributing in what degree to limiting potentially sustainable bull trout populations in the Muddy Creek WAU. The riparian habitat is degraded, streambed substrate is embedded, there are low numbers of instream wood, the quality of pool habitat is degraded, and temperature levels are elevated. There are also well distributed populations of brook trout within the WAU.

There are no known natural blockages to prevent fish passage from the Pend Oreille River into drainages within the Muddy Creek WAU, however the box culvert under State Hwy. 31 at the mouth of Big Muddy Creek is identified as a partial, man-made barrier to fish passage. Also, at RM 1.2 on Big Muddy Creek, the County Rd. 2705 (Greenhouse Rd.) culvert is identified as a fish passage barrier. The extent to which bull trout could have successfully utilized habitat historically within the Muddy Creek WAU is unknown. Bull trout have not been documented as occurring currently in the Muddy Creek WAU although both Little and Big Muddy creeks have been identified as containing “Recoverable” habitat.

#### **Ruby Creek WAU (45,213 acres).**

The Ruby Creek WAU includes the Lost and Ruby creek drainages which feed into the Box Canyon Reservoir portion of the Pend Oreille River. The existing habitat in the WAU has been modified somewhat by human activities and bull trout are not known to currently occur in the WAU. In the Ruby Creek drainage, the high level of embeddedness of the substrate, high water temperatures, low numbers of deep pool habitat for winter rearing, and well distributed populations of brook trout are limiting factors for the bull trout. It is unclear from the literature which human-caused actions are contributing in what degree to limiting potentially sustainable bull trout populations in the WAU.

There are no known natural blockages to prevent fish passage from the Pend Oreille River into either Lost Creek or Ruby Creek. The extent to which bull trout could have successfully utilized Ruby Creek WAU habitat historically is not clear based on existing information. Bull trout have not been documented as occurring currently in the Ruby Creek WAU. The TAG has identified “Recoverable” bull trout habitat in the Ruby Creek drainage and “Suitable” bull trout habitat in S. Fk. Lost Creek of the Lost Creek drainage.



### **LeClerc Creek WAU (64,285 acres).**

The LeClerc Creek WAU encompasses the entire LeClerc Creek watershed, which drains into the Box Canyon Reservoir reach of the Pend Oreille River. High sediment loading from high road density and poorly constructed roads are contributing to degradation of instream habitat conditions, specifically by pool filling and fining of spawning gravels. Many of the references to sediment loading related to road maintenance issues noted in this habitat limiting factors assessment report are referenced from the 1997 WDNR LeClerc Creek Watershed Analysis. In the interim 5+ years since the 1997 WDNR watershed analysis, Stimson has developed a Sediment Reduction and Road Maintenance and Abandonment Plan (RMAP) for the LeClerc Creek WAU and begun its implementation to correct or mitigate issues identified in the 1997 WDNR watershed analysis.

Brook trout occur throughout the WAU presenting a high degree of potential competition with bull trout for habitat needs. Riparian areas with a central brushy corridor are typical in the WAU and instream LWD levels are lacking for a majority of fish-bearing streams. However, evidence of groundwater influence in both the West Branch and East Branch LeClerc creeks, the low incidence of natural fish passage barriers within the LeClerc Creek drainage, “Suitable” and “Recoverable” bull trout habitat, and confirmed observations of both adult and juveniles life stages, strongly suggest beneficial conditions exist in the LeClerc Creek drainage for bull trout, especially if sediment input can be decreased.

There are no known natural blockages to prevent fish passage from the Pend Oreille River into LeClerc Creek. Historic use of the LeClerc Creek drainage by bull trout (called “char” historically) has been documented (Smith 1983). Generally, fish distribution in the LeClerc Creek drainage is naturally limited by increased gradients and diminished discharge in headwater reaches, with the exception of Fourth of July Creek and West Branch LeClerc Creek. Some steep gradient reaches occur at RM 0.25 on Fourth of July Creek, potentially limiting upstream bull trout passage. On West Branch LeClerc Creek, dewatering reaches have been identified as occurring at RM 1.5. There are some known human-made fish passage barriers in the WAU that preclude access to a portion of “Suitable” and “Recoverable” habitat.

### **Middle Creek WAU (29,270 acres).**

The Middle Creek WAU encompasses both the Middle Creek and Mill Creek drainages. The Middle and Mill creek drainages feed into the Box Canyon Reservoir portion of the Pend Oreille River. The stream habitat in Middle Creek appears to be impacted from high volumes of sediment. Generally, the impacts have resulted in limited winter and spawning habitat for fish populations in Middle Creek. In Mill Creek, the existing habitat has been modified by human activities within the watershed. The high level of embeddedness of the substrate, low numbers of deep pool habitat for winter rearing, summer water temperatures near the expected tolerance levels and well distributed populations of brook trout are limiting factors for the species. Portions of the instream habitat appear to be of poor to fair quality throughout most of the Mill Creek drainage.

The extent to which bull trout could have successfully utilized habitat within the Middle Creek WAU historically is unknown. A steep-gradient reach starting at RM 0.25 is a potential natural barrier to upstream fish passage on Middle Creek; on Mill Creek, a natural falls at RM 1.3 is a barrier to upstream fish passage. To date, a single observation of a bull trout in Mill Creek in 1995 is the only documented occurrence of bull trout within the WAU. “Recoverable” bull trout habitat has been identified by the TAG in both the Mill and Middle creek drainages; “Suitable” bull trout habitat has been identified by the TAG in the Middle creek drainage.

#### **Cee Cee Ah Creek WAU (27,050 acres).**

The Cee Cee Ah Creek WAU encompasses the entire Cee Cee Ah Creek drainage and small tributaries draining into the Pend Oreille River from the east between Mill Creek and Skookum Creek. The existing habitat has been modified by human activities within the watershed. The high level of embeddedness of the substrate, low numbers of deep pool habitat, summer water temperatures near the expected tolerance levels of bull trout, and well distributed populations of brook trout are limiting factors for the species. The degraded habitat conditions limit overwinter and spawning habitat. Large woody debris levels on USFS land are unknown, however LWD recruitment is thought to be adequate. Portions of the instream habitat appear to be of poor to fair quality throughout most of the Cee Cee Ah Creek drainage.

The extent to which bull trout could have successfully utilized habitat historically within the Cee Cee Ah Creek WAU is not clear based on existing information. Other than the natural barrier at RM 2.5 on Cee Cee Ah Creek, there are no known natural blockages to prevent fish passage from the Pend Oreille River into Browns Creek or up to RM 2.5 on Cee Cee Ah Creek. Both Cee Cee Ah Creek and Browns Creek have been identified as containing “Suitable” bull trout habitat.

#### **Tacoma Creek WAU (62,887 acres).**

The Tacoma Creek WAU encompasses both the Cusick and Tacoma creek drainages which feed into the Box Canyon Reservoir portion of the Pend Oreille River, entering from the west. The existing habitat has been modified somewhat by human activities within the WAU. In the Tacoma Creek drainage, low numbers of LWD, low numbers of deep pool habitat for winter rearing, summer water temperatures above the expected tolerance levels for the species, and well distributed populations of brook trout are limiting factors. In the Cusick Creek drainage, the high level of embeddedness of the substrate, low numbers of deep pool habitat for winter rearing, summer water temperatures near the expected tolerance levels for the species, and well distributed populations of brook trout are limiting factors.

The extent to which bull trout could have successfully utilized Tacoma Creek WAU habitat historically is not clear based on existing information. There are no known natural blockages to prevent fish passage from the Pend Oreille River into Cusick or Tacoma creeks. Bull trout have not been documented as occurring currently in the Tacoma Creek WAU; presently the State Hwy. 20 culvert at RM 0.5 on Cusick Creek is a full barrier to fish passage. There are no known man-made barriers on Tacoma Creek. Both the Cusick and the Tacoma creek drainages have been identified by the TAG as containing “Recoverable” bull trout habitat.

### **Calispell Creek Drainage (92,523 acres).**

Together the Winchester Creek WAU (49,073.5 acres) and Tenmile Creek WAU (43,449.7 acres) make up the Calispell Creek watershed. The Winchester Creek WAU and the Tenmile Creek WAU encompass all tributaries draining into Calispell Creek which ultimately drains into the Box Canyon Reservoir segment of the Pend Oreille River.

The fish passage barrier presented by the pumping station at RM 0.5 on Calispell Creek is the most limiting factor to sustaining bull trout populations in the Calispell Creek watershed. If passage were provided at the pump station however, degraded habitat conditions on Calispell Creek from the mouth upstream to Calispell Lake may act in combination to create seasonal barriers for migration to and from the Pend Oreille River (DE&S 2001b, pg. 2). Some tributaries to Calispell Creek could provide habitat for resident and adfluvial bull trout life history forms given access to the Pend Oreille River, however several major barriers restrict access into tributaries within the watershed. In particular, bull trout passage into the entire N. Fk. Calispell Creek tributary system is naturally precluded by barrier falls and cascades in Power Creek downstream of Power Lake (POPUD 2000b, pg. 10; DE&S 2001b). Sediment delivery to streams from mass wasting events, harvest activities, agricultural sources, stream channel instability, and roads is insignificant compared to the natural background rate of erosion in the watershed and nearly all sediment transport in the South Fork Calispell Creek and Winchester and Dorchester creeks is eventually captured in Calispell Lake. Most of the North Fork Calispell sediment load is captured in Power Lake. Below Calispell Lake, the flow and natural gradient are not sufficient during most of the year to move existing sediment loads (DE&S 2000). The extent to which the dikes and flood control management in the Calispell Creek floodplain affect sediment transport, if at all, is not known. Competition from non-indigenous populations of brook trout also presents a significant limiting factor to bull trout recovery in the Calispell Creek watershed.

The extent to which bull trout could have successfully utilized Calispell Creek watershed habitat historically is not clear based on existing information. There were no known full, natural blockages historically to prevent fish passage between the Pend Oreille River and the Calispell Creek watershed. There is historical documentation that the Calispell drainage was one of the main tribal fisheries sites in the lower Pend Oreille River where great numbers of trout (although not char by name) and small fish were documented as being captured there annually, both in summer and fall. Bull trout have not been documented as occurring currently in the Calispell Creek watershed. The TAG has identified “Recoverable” bull trout habitat in the Calispell Creek watershed. The only “Suitable” bull trout habitat identified by the TAG in the Calispell Creek watershed is a 0.2 mile reach at the mouth of Power Creek.

### **Skookum Creek WAU (59,340 acres).**

The Skookum Creek WAU encompasses the Skookum, Indian, Marshall, and Exposure creek drainages. The drainages of the Skookum Creek WAU feed into the Box Canyon Reservoir portion of the Pend Oreille River. Animal keeping practices on land adjacent to Skookum Creek results in the most adverse impacts on this stream, specifically in the form of fecal coliform levels, riparian impacts, and bank destabilization. Spring activity in Skookum Creek is known to

provide cooler water temperatures than the reservoir during summer months. Radio-tagged brown trout were observed moving up into Skookum Creek from the Pend Oreille River as reservoir temperatures reached 18 - 20°C. Currently the lower reaches of Indian Creek have potentially fish-blocking culverts and lack structure and channel complexity, a result of land use practices. The main human-caused habitat limiting factors to sustaining bull trout in Indian Creek are possible fish-blocking culverts and secondly the lack of pool habitat. Eastern brook trout and brown trout are found in Skookum Creek and are very abundant in Indian Creek with nearly all age classes present.

The extent to which bull trout could have successfully utilized habitat within the Skookum Creek WAU historically is unknown. Bull trout have been currently documented as occurring in the Skookum Creek WAU with one bull trout having been located in Indian Creek. Both Skookum Creek and Indian Creek have been identified as containing “Recoverable” bull trout habitat.

#### **Deer Valley WAU (33,763 acres).**

The Deer Valley WAU encompasses the Davis, Bracket, Kent, and McCloud creek drainages, all of which feed into the Box Canyon Reservoir portion of the Pend Oreille River. There is a possibility of impacts from increasing development in the drainages of the Deer Valley WAU, however relatively little information is available in the literature on existing aquatic habitat conditions or human-caused alterations to stream function. The POCD collected baseline data monthly from September 1999 to September 2000 for some water quality parameters (POCD 2001c). The limited data showed problems with turbidity in Kent Creek and problems with temperatures above the criteria levels for “good” for some life history stages of bull trout.

The extent to which bull trout could have successfully utilized habitat within the Deer Valley WAU historically is unknown. Bull trout have not been documented as occurring currently in the Deer Valley WAU. Both Kent Creek and McCloud Creek drainage have been identified as containing “Recoverable” bull trout habitat.

#### **Priest River Tributaries**

##### **Priest River WAU (20,432 acres).**

The Priest River WAU encompasses the upper reaches of the Lower West Branch drainage. From its headwaters in Washington State, the Lower West Branch flows 25.3 miles southeastward into Idaho toward its confluence with the Priest River. It is unknown if bull trout inhabited Lower West Branch historically nor have bull trout been observed currently in the drainage. A complete fish migration barrier exists on the mainstem Lower West Branch at Torelle falls (RM 8.2) in Idaho. The Lower West Branch is a large and complex watershed system with a long history of extensive development and land uses. Elevated instream temperatures in the Lower West Branch from its confluence with the Priest River upstream to Torelle Falls, and continuing upstream of the falls, are believed to be the primary factor limiting bull trout use in the Lower West Branch (J. Cobb, M. Davis, USFS, pers. comm., 2002). Lack of canopy coverage to provide thermal regulation, along with a negatively impacted stream channel morphology, appear to be the mechanisms contributing to elevated instream temperatures (J.

Cobb, M. Davis, USFS, pers. comm., 2002). The destabilized channel morphology is being driven by elevated sediment loads and a low level of functional LWD in the system. Large woody debris recruitment is also limited. Brook trout occur in the drainage, but densities were low when the mainstem Lower West Branch was surveyed. Man-made fish passage barriers also exist in the drainage upstream of Torelle Falls.

Analyses and field survey data indicates that excessive sediment loading is and has been chronic in the drainage for a long period of time. The mainstem of the Lower West Branch has been adversely impacted by frequent introductions of large volumes of bedload, historic ditching of channels, past filling of wetlands, and altering of natural drainage patterns with road construction. The stream channel will not likely move towards stability until large scale rehabilitation projects are successfully implemented.

#### **Kalispell Creek WAU (49,402 acres).**

The Kalispell Creek WAU encompasses the upper drainages of the Upper West Branch, Binarch, Lamb, and Kalispell creeks within Washington State. The remainder of the drainages is located in Idaho State. The Upper West Branch and Binarch Creek flow into the mainstem of the Priest River; Kalispell and Lamb creeks flow into Priest Lake. From the Lamb Creek drainage south (including the Lower West Branch drainage in the Priest River WAU), tributaries to the Priest River drainage represent some of the more highly altered landscapes in the Priest River system. The headwater areas of drainages within the Kalispell Creek WAU are negatively impacted to a lesser extent than the rest of the drainage and are still functioning within the natural range of variability. The remaining areas of the drainages have multiple habitat degradation concerns.

In the drainages of the Kalispell Creek WAU, only Kalispell Creek has documented sightings of bull trout but the last reported observation of bull trout in Kalispell Creek was in 1984. There were no known natural blockages historically, nor are there presently, to prevent fish passage from the Priest River system into Binarch Creek, Lamb Creek, Kalispell Creek, or Upper West Branch.

#### **Granite Creek WAU (40,582 acres).**

Granite Creek WAU encompasses the North and South Forks of the Granite Creek drainage in their entirety. The remainder of the drainage is located in Idaho. Granite Creek is a major tributary to Priest Lake. The eastern boundary of the WAU, which is also the Washington/Idaho state line, bisects the Granite Creek drainage about ¼ mile upstream of the point where Granite Creek splits into the North and South forks. There were no known natural blockages historically, nor are there presently, to prevent fish passage from the Priest River system into the Granite Creek WAU. Currently, bull trout occur in Granite Creek in low densities.

Sediment levels in lower Granite Creek are the most limiting factor to sustaining bull trout populations in the drainage. Sediment delivery is from mass failures associated with roads. Second to elevated sediment levels in Granite Creek, stream channel confinement and riparian habitat degradation limit bull trout populations. The lower portion of the Granite Creek drainage (downstream of the Zero Creek confluence) transitions from the high integrity landscapes of the

upper drainage to landscapes at higher risk and with multiple ecological restoration needs. Of the streams flowing into Priest Lake from the west, Granite Creek is likely one of the most important stream in regards to maintaining bull trout persistence in this portion of the Priest River system. Overall, the ecological functions for the portion of upper Granite Creek drainage lying upstream of the Zero Creek confluence are consistently high.

### **Gold Creek WAU (15,339 acres).**

The Gold Creek WAU encompasses the upper reaches and headwaters of tributaries to Hughes Fork; the tributaries are Gold, Jackson, and Bench creeks, as well as the small, eastward draining tributaries to the very upper reaches of Hughes Fork. The remainder of the Hughes Fork drainage is located in Idaho. Hughes Fork flows into Upper Priest River in Idaho, just upstream of the northern tip of Upper Priest Lake. Only a very small portion of the Jackson and Bench Creek drainages are located in Washington.

The Hughes Fork drainage is considered critical to the viability of native fish species in the Priest River drainage, including bull trout. In the early-to-mid 1980s, Irving (1987, pg. 84) found bull trout throughout the upper Priest River drainage but reported that they were most abundant in tributaries of Upper Priest Lake with the highest densities being found in Bench (32 fish/100 m<sup>2</sup>) and Jackson (14 fish/100 m<sup>2</sup>) creeks, tributaries to Hughes Fork. The strongest remaining bull trout populations in the Priest River drainage are now found in association with Upper Priest Lake, although in declining numbers (Panhandle Basin Bull Trout TAT, 1998, pg. 9; IDFG redd surveys 1992 – 2001; Irving 1987). The decline in bull trout numbers has been attributed to healthy lake trout populations in the lake environments that out-compete bull trout for habitat and prey on juvenile bull trout that arrive as juveniles in Upper Priest Lake to mature (J. Dupont, IDFG, pers. comm., August 2002). Brook trout have been documented in Hughes Fork, Gold Creek, Jackson Creek, and Bench Creek. There were no known natural blockages historically, nor are there presently, to prevent fish passage from the Priest River system into Hughes Fork.

The Bench Creek and Jackson Creek drainages are relatively un-influenced by management activities with the exception of the Ledge Creek (a tributary to Jackson Creek) and the first quarter-mile of Jackson Creek. The remainder of the Jackson Creek drainage has not seen a fire since 1910 and has only been harvested using helicopters so there was no associated road building (USFS 1998c; J. Cobb, USFS, 1/29/03 final draft review comments, February 2003). Gold Creek has been adversely impacted by land use disturbances, primarily roads, and is one of the more heavily harvested and roaded drainages in the Hughes Fork watershed.

## **WRIA 62 Inventory and Assessment Data Gaps**

Listed below are the overriding WRIA-level inventory and assessment data gaps for WRIA 62. Obtaining this information will enable the public and technical staff to make natural resource management decisions at the WRIA-level with a higher degree of confidence in the outcomes. Data gaps at the WAU-level are listed in the “Salmonid Habitat Conditions by WAU” chapter of the report.

- A comprehensive fish passage barrier inventory and assessment, including private lands, with database and GIS coverage. The work should incorporate existing data from USFS, POPUD, KNRD, McLellan (2001), SSHEAR/WDFW, and DNR data. A comprehensive fish passage inventory and assessment should capture tributaries to the Pend Oreille River from their confluence with the Pend Oreille River upstream to their headwaters, where appropriate;
- Comprehensive surveys are needed in all tributaries to Upper Priest Lake and Priest Lake to determine the distribution and abundance of brook trout to better define native fish restoration options (KNRD 2001, pg. 148);
- Tributaries to the Pend Oreille River that have not yet been surveyed to determine bull trout presence or absence or the presence of suitable habitat, should be surveyed using accepted methodologies;
- Comprehensive fish management plan (POPUD 1/29/03 draft report review comments, March 2003).